

quire medicinal treatment as well, but early emphasis by physicians about personal habits shows that a patient's life-style has contributed to his or her illness and that moderating harmful habits would greatly enhance the effect of medication, resulting in lowered doses, fewer side effects and cost containment, and give patients a sense of control over their own health.

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Diet and Cancer

DESPITE ADVANCES in treatment, age-adjusted mortality rates of cancer have continued to increase at a rate of about 3% every decade. Data on secular trends in incidence are less reliable, but it is probable that age-adjusted incidence rates are increasing at an even greater rate. Most of the increases can be attributed to cigarette smoking, but many cancers unrelated to smoking (such as colorectal cancer) remain as important causes of death. The number of deaths each year due to colorectal cancer (about 60,000) is second only to lung cancer (about 126,000), and it is the leading cause of cancer death in nonsmokers.

Diet appears to play a role in the risk of colorectal cancer. Burkitt's observation with Trowell, Cleave and others that Africans appeared to be at very low risk for colorectal cancer stimulated others to examine the effect of dietary fiber in case-control studies. Several such studies supported the idea that fiber might reduce the risk of colorectal cancer, whereas others were inconclusive. Graham in upstate New York observed that certain vegetables (broccoli, cabbage and brussels sprouts) were associated with a particularly low risk of colorectal cancer.

We suggested that vitamin D and calcium might reduce the risk of colorectal cancer, based on the strong geographical gradient for colorectal cancer in the United States and throughout the world. In particular, colorectal cancer seemed to occur much more frequently in places distant from the equator than in equatorial regions. This theory stimulated further investigation of the possible role of dietary vitamin D and calcium because a principal effect of latitude is increased synthesis in the skin of vitamin D from cholesterol and increased intestinal uptake of calcium.

In a recent study we examined the risk of colorectal cancer according to dietary intake of calcium and vitamin D in Chicago men. Because the men lived in a place where there is relatively little sunshine, well below the US median for solar energy from ultraviolet light at ground level per day, we speculated that dietary sources of vitamin D would be important.

The results of this study show that men who had the lowest intake of vitamin D and calcium had nearly three times the risk of colorectal cancer as men who had the highest intake. Men with intermediate intakes had an intermediate risk of colorectal cancer.

This finding can be added to the work of Shekelle, Bjelke and others showing a protective effect of the carotenes, vegetable-derived previtamin A, on the risk of lung cancer and that

of Graham and others showing protective effects of citrus fruit on cancer of the upper gastrointestinal and respiratory tracts. Another study by Phillips showed a reduced risk of many varieties of cancer in association with a Seventh-Day-Adventist (vegetarian, nonsmoking, non-alcohol-drinking) life-style.

A diet to reduce the risk of cancer would include 2.5 to 3 glasses a day of nonfat milk (or 1,000 mg of calcium and 200 to 400 international units of vitamin D₃ per day for lactose-intolerant persons), yellow and green leafy vegetables at least once a day and citrus fruit or juice daily. Such a diet would also require moderation in the use of alcohol (two or fewer drinks, glasses of wine or bottles of beer per day). Restricting fat intake to no more than 20% to 30% of calories and including a bran muffin or the equivalent in dietary fiber every two days would likewise be prudent.

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Hyperlipidemia and Preventing Coronary Heart Disease

THE ASSOCIATION between hyperlipidemia, especially high low-density-lipoprotein cholesterol, and the incidence of coronary heart disease is a consistent finding in most, if not all, prospective population studies. Indeed, the observed association meets the established scientific criteria for causation and poses two important questions for clinicians. The first question is whether a blood cholesterol-lowering regimen should become a routine part of a practitioner's efforts at prevention. The second question, more strategic than conceptual, is what should be the target population for such a regimen?

Clinical trials on secondary prevention of coronary heart disease—that is, preventing death following acute myocardial infarction—have failed to show a beneficial effect of reducing the blood cholesterol level by dietary means, cholesterol-lowering drugs or both. Thus, in regard to secondary prevention of coronary heart disease, the first question cannot be answered in the affirmative. This makes the second question moot.

As for primary prevention—that is, preventing disease before it strikes—there is evidence that lowering blood cholesterol levels could be beneficial in some persons. Results of a recently completed trial in the Lipid Research Clinical Centers showed that the combination of a prudent dietary regimen and a cholesterol-lowering drug, such as cholestyramine, reduced the incidence of fatal and nonfatal coronary heart disease in men with average blood cholesterol levels of 260 mg per dl and above. Thus, the answer to the first question for primary prevention of coronary heart disease is a qualified